

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

The United Illuminating Company Application for a Certificate of Environmental Compatibility and Public Need for the Construction, Maintenance, and Operation of a Proposed 115-kV/13.8-kV Electric Substation and Associated Facilities at 3-7 Wildflower Lane, Trumbull, Connecticut)))))))	Docket 317 November 30, 2006
--	---------------------------------	---

PRE-FILED TESTIMONY OF RICHARD J. REED

Q: What is the purpose of your testimony?

A: The purpose of this testimony is to provide The United Illuminating Company's analysis of several issues that were discussed at the Siting Council's hearing on October 26, 2006 and to respond to requests from the Council for additional information:

- A detailed description of the costs and issues if the substation were relocated to Site 11 at Quarry Road.
- The impact on noise levels at the property boundaries if the substation is moved to the north within Site 1 at Wildflower La.
- The impact on magnetic field levels at property boundaries from moving the substation to the north within Site 1.

Q: What are the primary benefits of the Trumbull Substation project?

A: The primary benefits of the project are:

- To provide 58MW of substation capacity to the greater Trumbull region to meet the growing electric demand and relieve the existing overloads at Trap Falls and Old Town Substations; and
- To provide a transmission reliability benefit on the 115 kV transmission system by breaking up the three terminal 1730 transmission line into three independently protected transmission lines.

Q: Can both of these benefits be achieved at the Quarry Road site ("Site 11").

A: Yes.

Achieving a transmission reliability benefit at Site 11 equivalent to the reliability benefit obtained at the proposed site would require relocation of the 1730 transmission junction from the existing location at Site 1 to Site 11. A schematic representation of the design is shown in Figure 1.

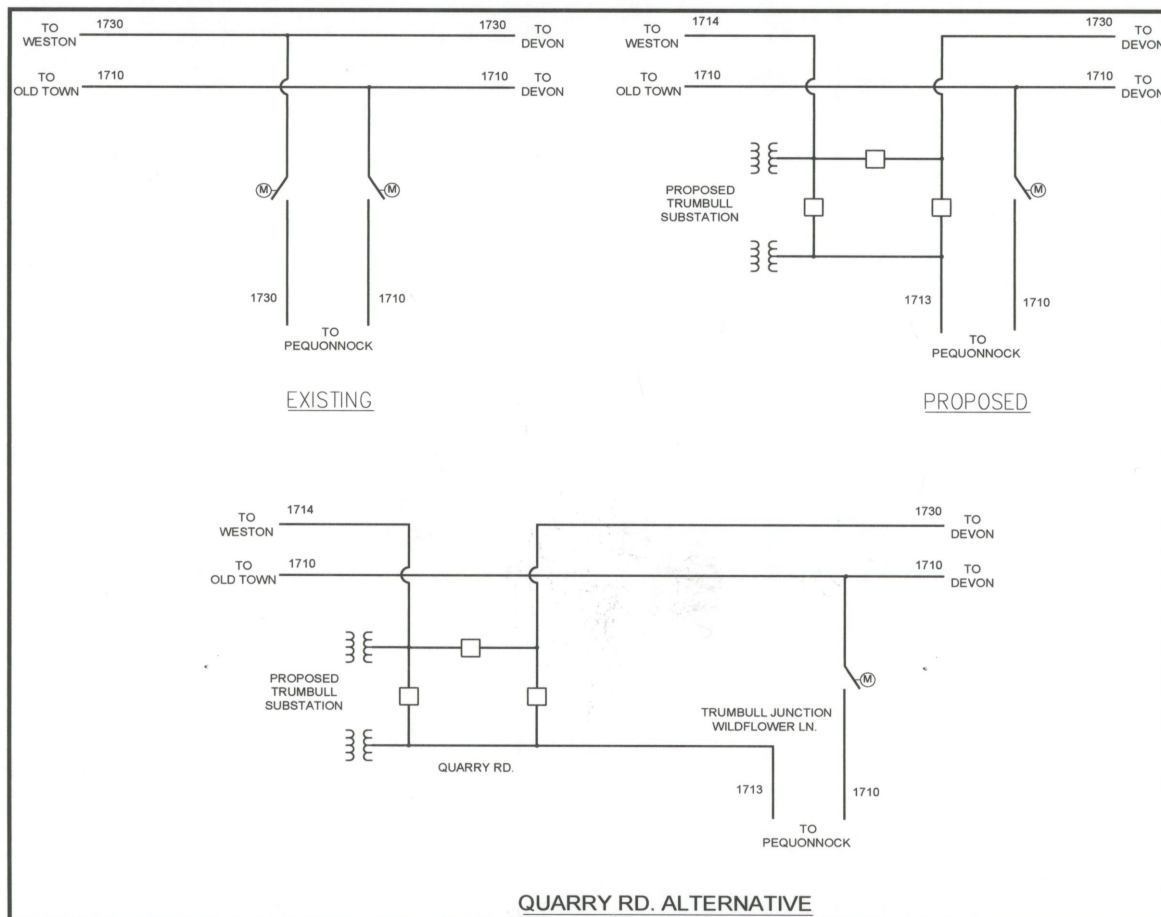


Figure 1

There are three alternative transmission routes that the Company considered in relocating the junction.

- Overhead along the existing CL&P right of way ("ROW")
- Underground along the existing CL&P ROW
- Underground along public roadways

These routes are illustrated in Figure 2. The purple lines represent the boundaries of the CL&P ROW and the yellow line represents the underground route along town roads.

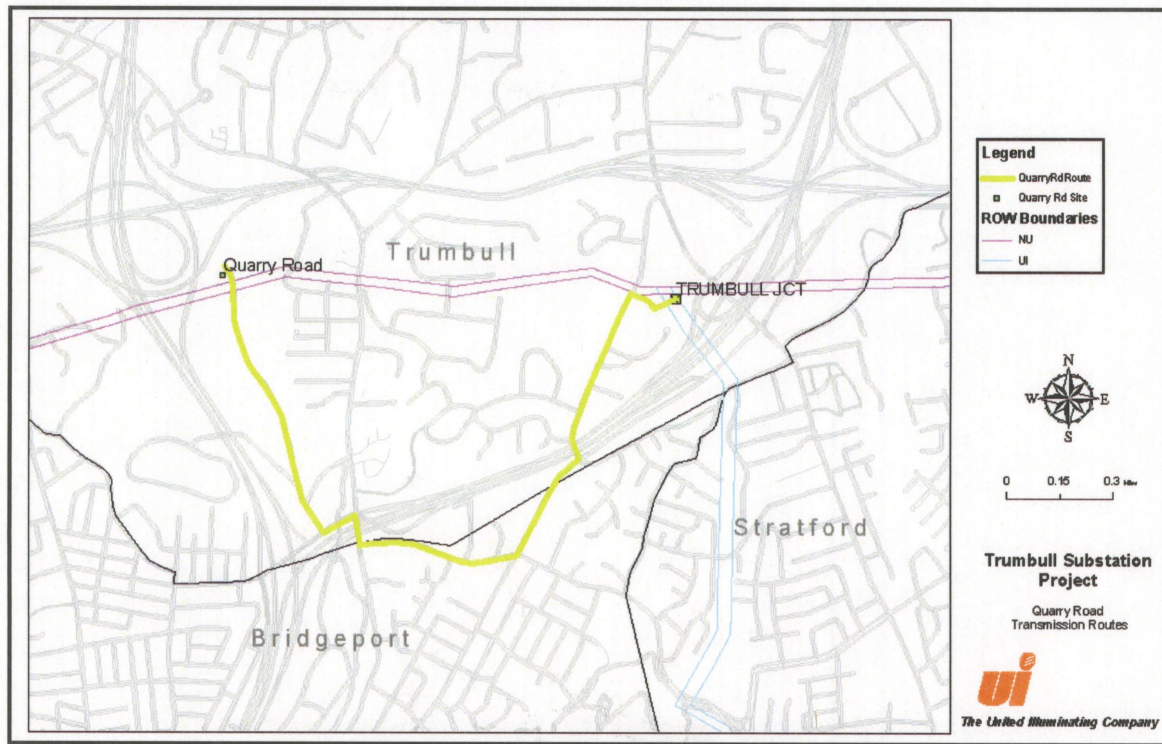


Figure 2

Overhead Route along the CL&P ROW

The most direct path for an overhead route between the Site 1 and Site 11 would be located on the existing CL&P ROW. UI currently has no rights to construct a transmission line on this ROW, and therefore, an agreement would need to be reached with CL&P.

CL&P's 1710 and 1730 lines are currently located on double circuit structures on the ROW. The Company's preliminary analysis indicates that in order to extend the 1730 line from the Site 1 to Site 11 a new line will need to be created on new structures on the south side of the ROW. In order to obtain the necessary clearances for this line a minimum additional 20 feet of ROW must be acquired to the south of and along the length of the ROW between Wildflower Lane and Quarry Road. Increasing the width of the right of way may impact Trumbull zoning requirements and require variances for the impacted properties. At this time such impacts cannot be quantified. An illustration of the ROW and associated clearances is shown in Figure 3:

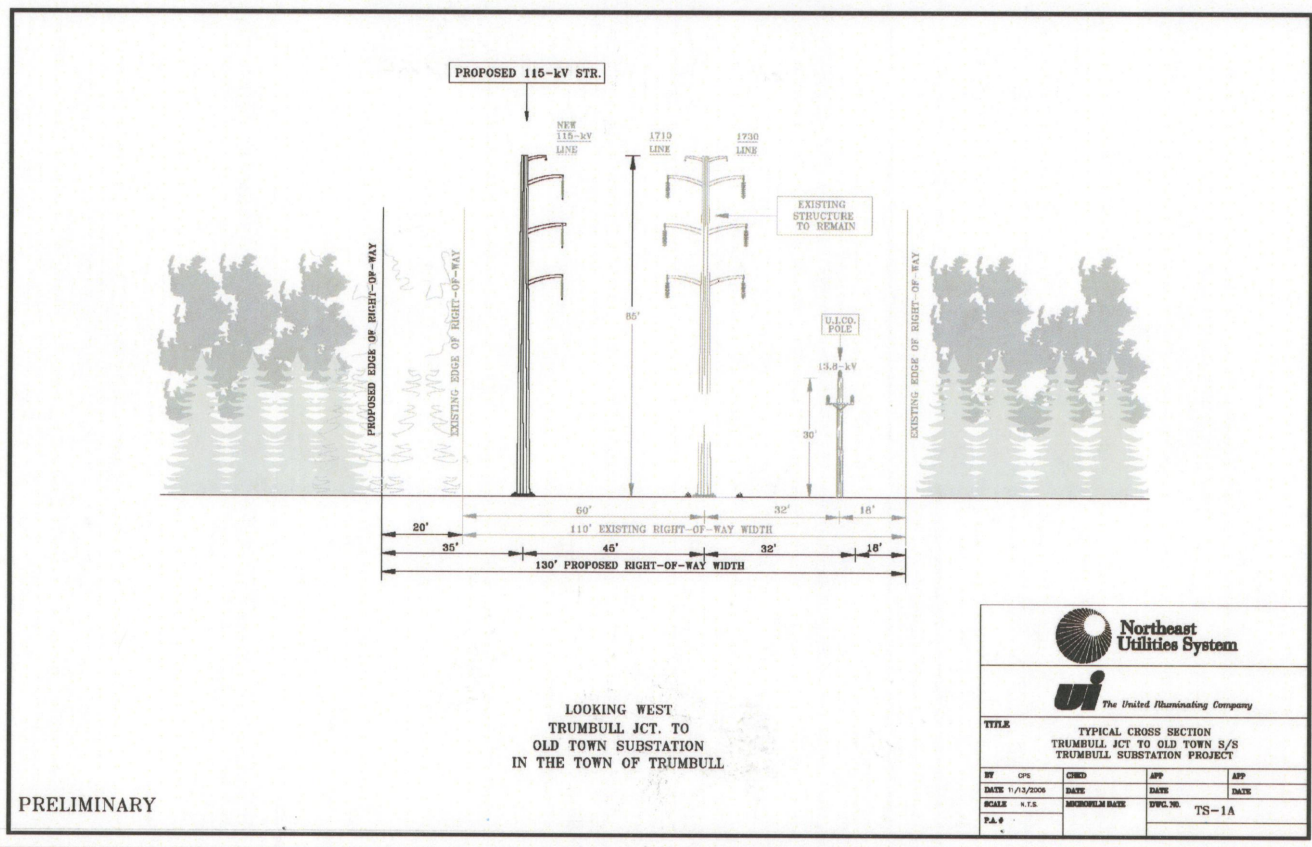


Figure 3

The estimated costs to construct this line are shown in Table 1. The ROW acquisition costs for the additional 20 feet of ROW are assumed to be \$250,000/acre – typically easement rights are negotiated beginning at 50% of the land value this is consistent with UI's site selection study assumption of \$500,000 per acre.

A map of the additional 20 feet of ROW is included as Attachment A.

Table 1
Estimated Cost for Overhead 115kV Transmission Line - Wildflower Lane to Quarry Road*

Item	Description	Quantity	Units	Unit Price	Extended Price
1	115 kV Overhead Transmission Line - single circuit	1.4	miles	\$ 1,700,000	\$ 2,318,182
2	Negotiated agreement for use of CL&P ROW	1	ea	\$ -	\$ -
3	Acquisition Costs for Additional 20' ROW	3.4	acres	\$ 250,000	\$ 850,000
Total for Overhead Option ROW					\$ 3,168,182

* Transmission line cost data is based on the Connecticut Siting Council's Investigation into the Life Cycle Costs of Electric Transmission Lines – Final Report October 31, 2006.

Underground route along the CL&P ROW

The most direct path for an underground route between Site 1 and Site 11 would be located on the existing CL&P ROW. Neither UI nor CL&P currently has the rights to construct an underground transmission line on this ROW, therefore, a 40'

access right for construction of underground facilities would need to be acquired from land owners along the route.

The terrain in the ROW between Site 1 and Site 11 consists of two water crossings, a wetlands crossing and relatively steep, rocky terrain. As discussed extensively in Docket 272, installation of underground cable is most efficient when placed in terrain that is flat and straight. Steep terrain increases the cost and technical complexity of the project. A plan and profile view of the ROW is included as Attachment B, sheets 1-4 to illustrate the elevation changes on the right of way. The water crossings, and steep and rocky terrain will increase the cost of construction above the estimated cost per mile assumed in the Life Cycle Cost Estimates.

As with the overhead route the ROW acquisition costs for the additional 40 feet of ROW are assumed to be \$250,000/acre.

Table 2
Estimated Cost for Underground 115kV Transmission Line -
Wildflower Lane to Quarry Road on CL&P ROW*

Item	Description	Quantity	Units	Unit Price	Extended Price
1	115 kV Underground Transmission Line - single circuit, 1750 kcmil, solid-dielectric, with duct bank	1.4	miles	\$ 8,800,000	\$ 12,000,000
2	115 kV cable riser structures with steel, terminators, surge arresters, concrete, three-phase	2	ea	\$ 150,000	\$ 300,000
3	Acquisition Costs for 40' UG Right of Way	6.8	acres	\$ 250,000	\$ 1,700,000
4	Mobilization and demobilization of J&B /HDD contractor	1	Each	\$250,000	\$250,000
5	Swamp, about 270' wide between str.834 and 835, HDD / jack and bore (J&B)	1	Each	\$500,000	\$500,000
6	Wet land, aprox 50' wide, 200' west of structure # 839, J&B	1	Each	\$100,000	\$100,000
7	Culvert 30' east of Str. 841, requires 150' wide J&B	1	Each	\$100,000	\$100,000
8	Culvert 170' east of Str. 842, requires 100' wide J&B	1	Each	\$100,000	\$100,000
9	Skating ring inside Trumbull Park, requires 250' HDD/J&B	1	Each	\$500,000	\$500,000
10	Pequonnock River crossing requires 200' HDD/J&B	1	Each	\$500,000	\$500,000
11	Rock removal	4400	Feet	\$300	\$1,320,000
12	Acquisition costs for J&B/HDD and splicing chambers' locations	6	Each	\$50,000	\$300,000
Total for Solid-Dielectric Option ROW					\$ 17,670,000

* The estimate given represents UI's best effort, at this preliminary stage, to quantify the costs of constructing an underground transmission line on the existing ROW. Because of the challenges with elevation associated with this ROW, further engineering would be required to determine constructability of this route.

Underground Route along Public Roadways

A possible route from Quarry Road to Wildflower Lane via public roads is depicted by the yellow line in Figure 2. Estimated costs for constructing this route are shown below:

Table 3
Estimated Cost for Underground 115kV Transmission Line -
Wildflower Lane to Quarry Road on Public Roadways

Item	Description	Quantity	Units	Unit Price	Extended Price
1	115 kV Underground Transmission Line - single circuit, 1750 kcmil, solid-dielectric, with duct bank	2.4	miles	\$ 8,800,000	\$ 21,120,000
2	115 kV cable riser structures with steel, terminators, surge arresters, concrete, three-phase	2	ea	\$ 50,000	\$ 100,000
3	600' HDD across Rte 8	1	ea	\$ 2,000,000	\$ 2,000,000
4	200' HDD across pequonnock river	1	ea	\$ 500,000	\$ 500,000
Total for Solid-Dielectric Option					\$ 23,720,000

- Q. If the Siting Council issued an order approving the substation but siting it on Quarry Road, which alternative would the Company propose to achieve the same transmission benefit that will happen if the substation is located on Site 1?
- A. If the Siting Council approved the substation at the Quarry Road site, the Company would not construct any of the alternatives listed above. The cost to achieve the transmission reliability benefit at Site 1 is approximately \$1,100,000. At this cost, the Company believes that the reliability benefit of breaking up the three terminal line can be justified at the Wildflower Lane location. The cost to achieve the transmission reliability benefit at Site 11 is estimated to be between \$3.2 million - \$23.7 million

Although an overhead alternative would be the most cost effective means of relocating the 1730 transmission junction to the Quarry Road site, as opposed to an underground alternative, the overhead route would require additional transmission structures to be installed and would also require additional ROW. This will require the acquisition of land from adjacent residential, commercial and municipal land owners. Therefore the company does not support this alternative.

The two underground alternatives minimize the impact to residential and commercial customers, but the costs, in excess of \$17 million, are more than 1500% greater than the cost of the project as proposed for Site 1. The Company believes that the increased costs of these alternatives are not justified by the benefit. Therefore, if the Siting Council approves the substation, but sites it at Quarry Road, the Company would not construct the transmission reliability component of the project at this time. Further studies would be performed and a new project would likely be proposed at Site 1 to achieve this benefit.

- Q. Please describe the distribution capacity benefit provided by the Company's proposed solution at Site 1.

- A. The distribution capacity benefit has two discreet components.
- Relieving the existing overloads at Old Town and Trap Falls Substations.
 - Providing capacity in the region to support future growth.

Q. Can a substation constructed at the Quarry Road site provide these benefits?

A. Yes.

Relieving the existing overloads at Old Town and Trap Falls Substations

In the Company's application, four feeders were identified to be transferred from Old Town and Trap Falls to Trumbull Substation: Old Town 2620 and 2627 and Trap Falls 3545 and 3547. These feeders were chosen primarily because they were the closest feeders in proximity to the Wildflower Lane location.

Those four feeders are also closest to the Quarry Road site. The topology of the feeders from Old Town allows the feeders to be picked up from both Site 1 and Site 11 with short feeders onto the existing distribution ROW.

Because Site 11 is located further west from Trap Falls, locating the substation at this site requires the distribution feeders to be extended approximately 2.4 miles from the Quarry Road site to a point on the route that is common with the route from Site 1. The Company evaluated other alternative routes and determined that the route shown below is the most viable route to the location of the Trap Falls feeders to the north and east.

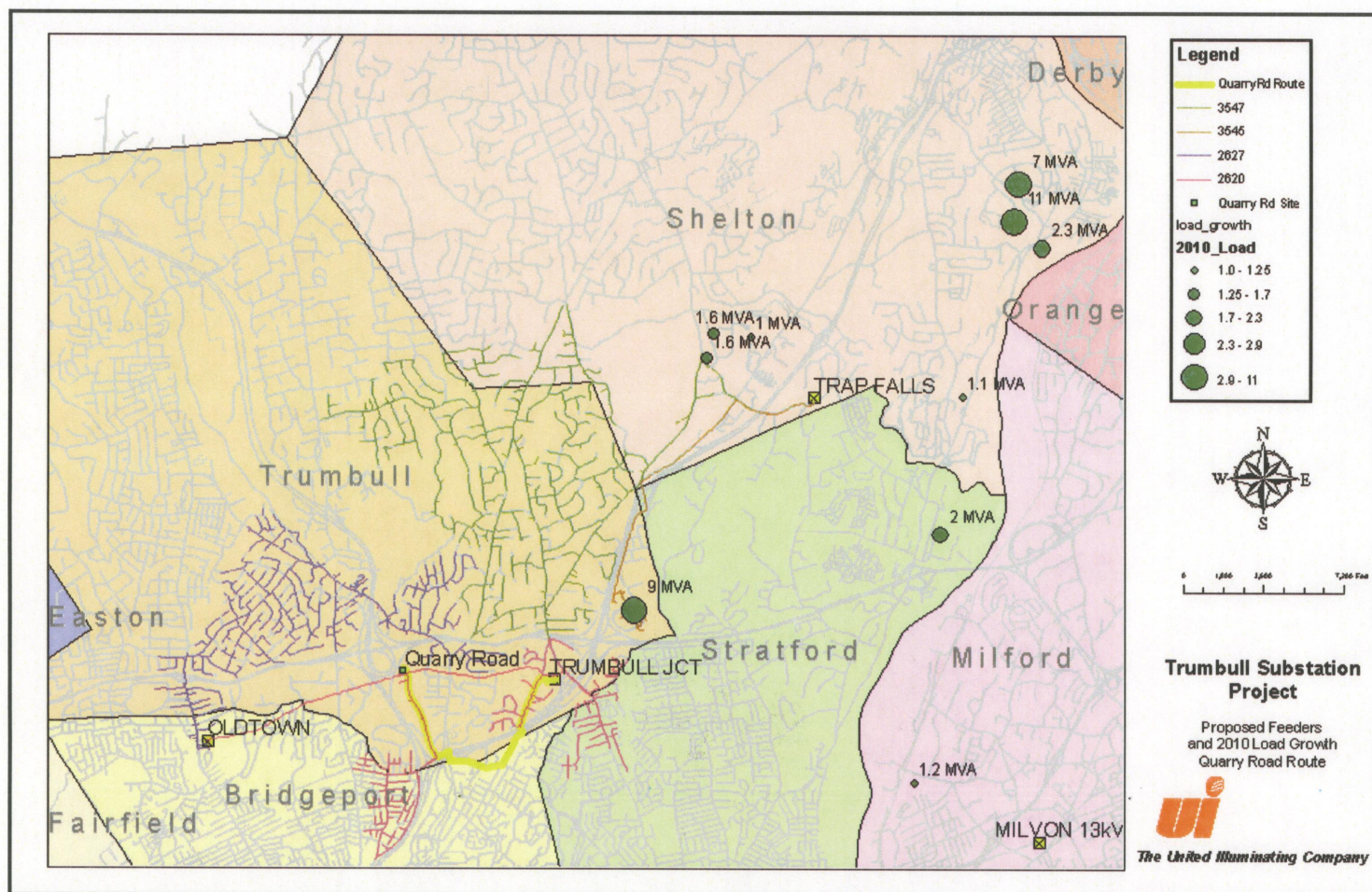


Figure 4

Providing capacity in the region to support future growth

Based on the Company's review of Site 11, it appears to be suitable for the construction of a 115 kV to 13.8 kV 58 MVA substation to provide the necessary substation capacity for growth into the future. Its location, however, is not optimally suited to serve future load growth in the region. Figure 4 contains UI's load growth projections for identified loads before 2010, over 1 MW that have a greater than 50% of probability of occurrence. A significant amount of future load growth will occur to the north and east of the Wildflower Lane site. Siting the substation at Quarry Rd will add the costs and reliability impacts of an additional 2.4 miles of distribution feeder exposure for each feeder that is routed in this northeasterly direction.

- Q. Please describe distribution design assumptions for the Quarry Road site.
- A. The distribution design considered for the Quarry Road site assumes that the substation would initially pick up the same feeders as the proposed site, Old Town 2620 and 2627 and Trap Falls 3545 and 3547.

The new circuits picking up Old Town feeders 2620 and 2627 would exit the new substation underground and connect to the open wire on the CL&P ROW. Feeder 2627 would be connected to the westbound open wire on the CL&P ROW, feeder 2620 would be connected to the east bound open wire on the CL&P ROW. A normally open, tie air break switch would be installed separating the two circuits. Existing northbound open wire on Reservoir Avenue at the intersection with the ROW would be connected to the existing westbound conductors on the 2620 ROW to pick up circuit 2627 from the new substation at Quarry Road. A new tie air break switch would be installed south of the ROW to isolate the new circuit from the existing circuit 2622.

The new circuits picking up Trap Falls 3545 and 3547 would exit the new substation underground in ductline that runs south on Quarry Road to Old Town Road (approximately 4300 feet). Because this would be the primary getaway for the substation, two duct banks would be installed to provide the necessary thermal conditions to support optimum ratings for the cables exiting the station. This ductline would tie in with existing ductline on Old Town Road and cross route 8 underground to Broadbridge Avenue. On Broadbridge Avenue the circuits would rise to aerial cable and continue north on Huntington Turnpike until the Route 8 overpass where they would dip into new ductline to pass under Route 8. The aerial cables would continue from this point north to the intersection of Huntington Turnpike and Nichols Avenue. The cables would dip back underground to traverse the Merritt Parkway in existing ductline. After crossing the Merritt Parkway, one cable would rise to pick up the circuit 3547 open wire while the remaining circuit would continue north on Shelton Road to pick up circuit 3545 at the intersection of Shelton Road and Bridgeport Avenue.

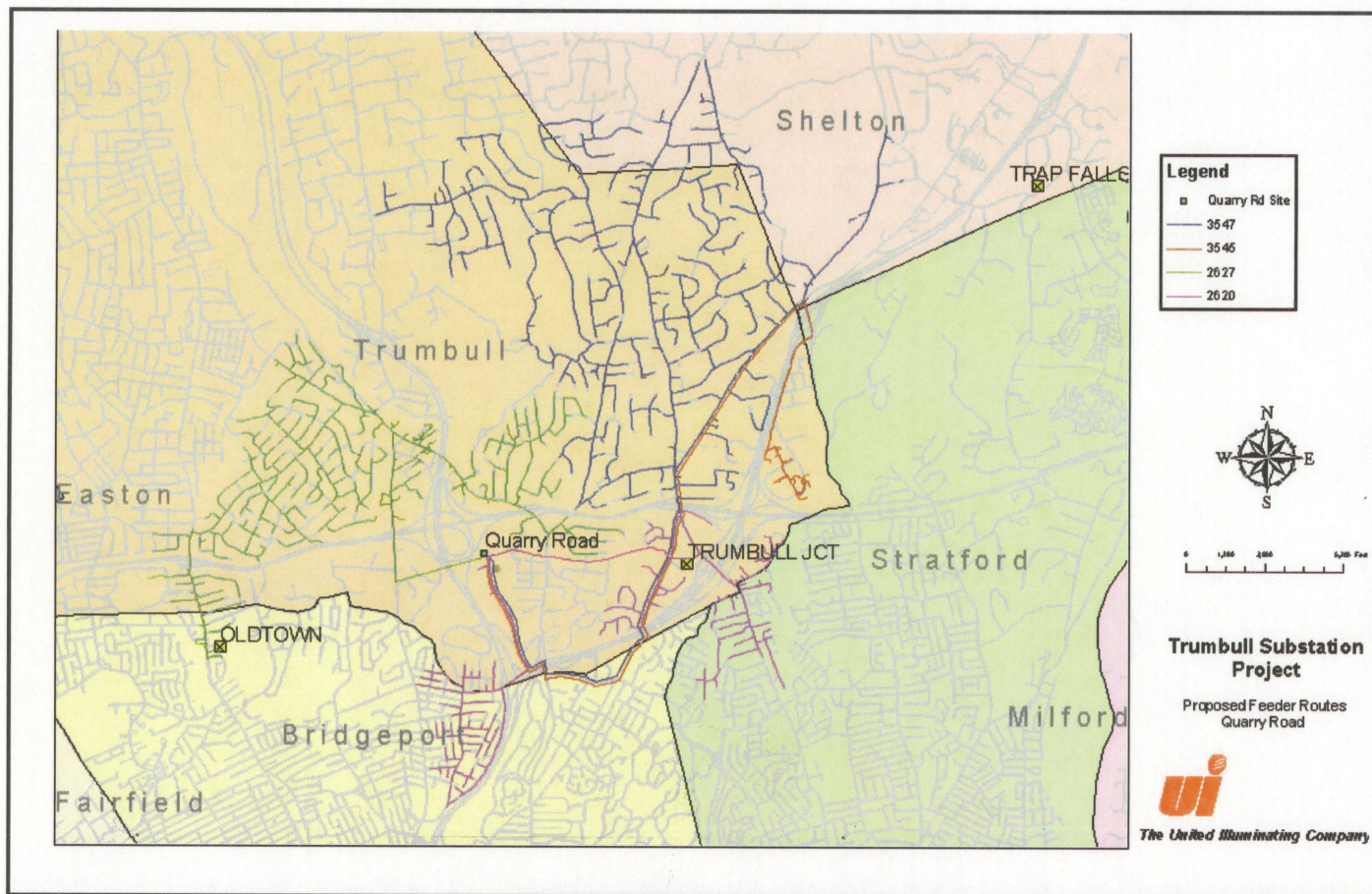


Figure5

- Q. Please summarize the major distribution equipment and the distribution costs necessary to serve feeders 2620, 2627, 3545 and 3547 from the proposed site and the Quarry Road site.
- A. The following table illustrates the major equipment and costs required to construct the distribution system for feeders 2620, 2627, 3545 and 3547 for both the proposed site and the Quarry Road site:

Table 4
Equipment Summary

	Quarry Rd	Wildflower Lane
Ductline (ft)	5,800	2,100
Aerial Cable (ft)	24,200	9,500
Underground Cable (ft)	15,500	6,700
Pole Replacements (ea)	52	40

Cost Summary

	Quarry Rd	Wildflower Lane
Engineering and Project Management	\$ 220,051	\$ 134,487
Construction	\$ 3,091,064	\$ 938,492
Materials	\$ 1,547,116	\$ 599,334
Overheads	\$ 860,692	\$ 434,588
Total	\$ 5,718,923	\$ 2,106,901

Distribution Differential Cost	\$ 3,612,022
--------------------------------	--------------

- Q. Are there any incremental transmission costs for constructing a solution to provide the distribution benefit at Site 11?
- A. Yes, to provide the distribution solution only, the substation at Site 1 would require only one breaker. The existing transmission structures at the proposed site are capable of routing the line into and out of the station. Therefore, to provide only the distribution solution at Site 1, UI would not require any additional transmission structures. At Site 11, two additional transmission structures would be required to dead-end the line. The height of the conductors on the CL&P ROW would require structures that are taller and more robust than typical transmission structures. The estimated cost of these structures is \$486,000.
- Q. Please summarize the minimum cost differential between Site 1 and Site 11 to provide the distribution capacity benefits:
- Relieving the existing overloads at Old Town and Trap Falls Substations.
 - Providing capacity in the region to support future growth.
- A. The minimum differential costs would be:

Table 6- Minimum differential costs to achieve distribution capacity benefit at Quarry Rd site

Transmission	486,000
Distribution	3,612,022
Site Preparation	15,000
Land *	7,500,000
Total	11,613,022

*On November 17, 2006 A Connecticut Post reporter forwarded to UI a copy of a letter from David D'Addario to Trumbull First Selectman Ray Baldwin indicating a willingness to sell the Quarry Road property by year end for a price of \$7.5 million. UI does not endorse \$7.5 million as the appraised or fair market value of the property.

- Q. What technical issues limit how far the substation can be moved to the north of the proposed location at Site 1?

- A. Access to the transmission structures on the existing ROW limits how far the substation could be moved to the north from the proposed location. CL&P has informed UI that it desires a clearance of at least 25 feet from the base of CL&P's transmission structures in the ROW to UI's fenceline in order for CL&P to maintain the transmission structures. This limits the distance the substation can be moved to the north to a maximum of 20 feet.
- Q. How would shifting the substation 20 feet to the north impact the noise levels at nearby properties?
- A. The Company has reviewed the potential impact on noise levels of relocating the proposed site equipment 20 feet north of the current proposed location on the residences closest to the noise source (transformers). This review was based on the noise study that was conducted for the proposed location which assumed the use of low-noise transformers and without perimeter architectural or noise barrier walls. Shifting the major equipment (transformers) 20 feet closer to the nearest northern residence (1500 Huntington Turnpike) would create the following changes in noise levels at nearby residences.

1500 Huntington Turnpike

Substation at proposed location: 41.6 dBA

Substation located 20' to north: approx. 42.6 dBA

Change: +1.0 dB

6 Wildflower Lane

Substation at proposed location: 40.9 dBA

Substation located 20' to north: 40.0 dBA

Change: -0.9 dBA

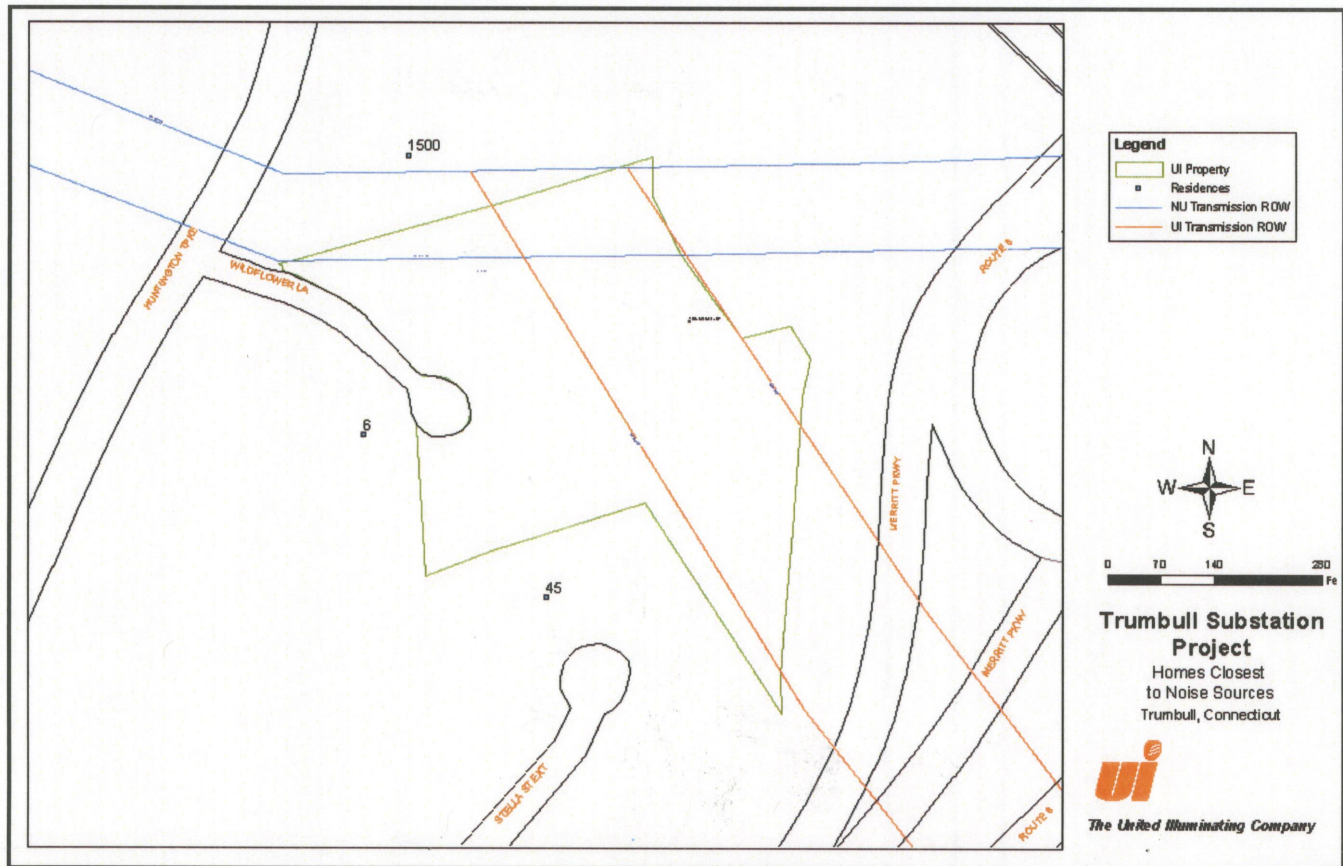
45 Stella Street

Substation at proposed location: 39.0 dBA

Substation located 20' to north: 38.3 dBA

Change: -0.7 dBA

The map below illustrates the location of these residences relative to the proposed substation.



Q How would shifting the substation 20 feet to the north impact magnetic field levels at nearby properties?

A The following drawing and table illustrate the measurement points and changes in magnetic field levels resulting from shifting the substation 20 feet to the north.

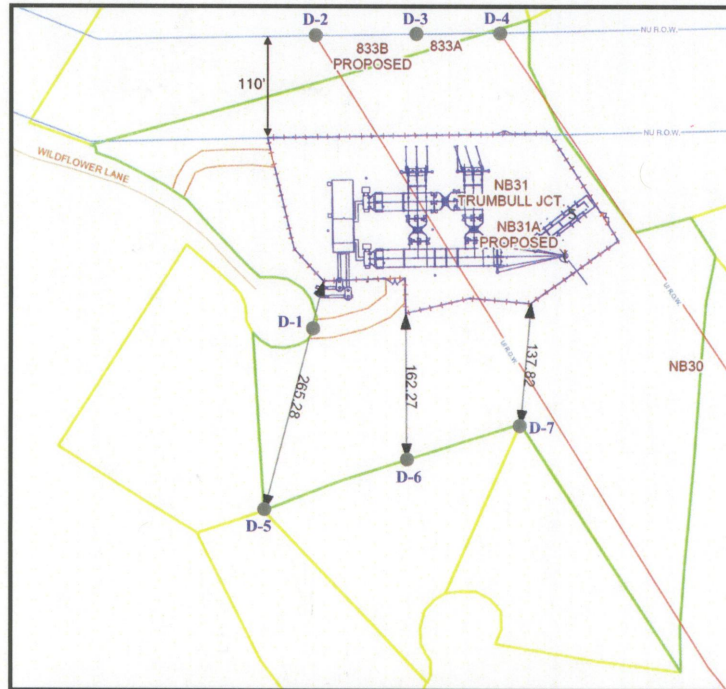


Table 7 – Magnetic Field Levels (mG) at Nearby Property Boundaries

							Normal Load (15 GW)						Peak Load (27 GW)					
Reference	Case 1	Case 1 N	Δ %	Case 2	Case 2 N	Δ %	Case 3	Case 3 N	Δ %	Case 4	Case 4 N	Δ %	Case 3	Case 3 N	Δ %	Case 4	Case 4 N	Δ %
Point D-1	1.1	1.1	0.0	1.3	1.2	-7.7	1.4	1.3	-7.1	1.0	0.9	-10.0	-2.5	2.4	-4.0	1.7	1.5	-11.8
Point D-2	24.4	24.4	0.0	23.9	23.7	-0.8	23.7	23.7	0.0	15.3	15.3	0.0	40.9	40.6	-0.7	25.1	24.9	-0.8
Point D-3	21.0	21.0	0.0	18.2	18.3	0.5	18.2	18.4	1.1	11.8	11.9	0.8	32.1	32.1	0.0	19.5	19.8	1.5
Point D-4	3.9	3.9	0.0	5.6	5.7	1.8	7.5	7.6	1.3	3.8	3.8	0.0	19.6	20.1	2.6	10.6	10.8	1.9
Point D-5	0.2	0.2	0.0	0.3	0.3	0.0	0.3	0.3	0.0	0.2	0.2	0.0	0.6	0.6	0.0	0.3	0.3	0.0
Point D-6	0.3	0.3	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.3	0.3	0.0	0.8	0.8	0.0	0.5	0.5	0.0
Point D-7	0.4	0.4	0.0	1.8	1.8	0.0	1.2	1.1	-8.3	0.9	0.9	0.0	1.3	1.3	0.0	1.0	0.9	-10.0

Case Descriptions

Case 1 Existing Configuration

Case 2 Pre-Bethel/Norwalk With Trumbull Substation

Case 3 Post-Bethel Norwalk with Trumbull Substation (15 GW & 27 GW Load Levels)

Case 4 Post-Middletown/Norwalk with Trumbull Substation (15 GW & 27 GW Load Levels)

NOTE: Cases 1N, 2N, 3N and 4N represent the substation being moved 20 feet to the north.

The Bethel Norwalk project has been energized, Case 2 is no longer a valid case but was included for comparison purposes.

Q Does this conclude your testimony?

A Yes